修士論文要旨

Ethanol-induced changes of the number of white blood cells in rats

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Introduction

Alcohol (ethanol) is widely used in most society for its pleasurable effects, but is known to cause many serious health and social problem. Alcohol attracts also widespread popularity as the chief of all medicine. According to the recent epidemiological studies, the J-curved effects are reported when the cardiovascular morbidity and mortality were plotted against the long period of ethanol consumption per day. These findings suggest that moderate drinking was associated with the lowering actions of cardiovascular risk factors such as obesity and high blood pressure, and drinking modulates both innate and acquired immune functions. However, the relationship between the degree of drinking and immune functions is not fully elucidated. Further, few reports are available on the acute response-effects of drinking on the number of white blood cells (WBCs). It is very important that these possibilities are studied from the view point of the physiological sciences, human sciences and alcohol biomedical sciences. Therefore, acute response-effects of single administration of ethanol on the number of WBCs were studied in male rats.

Methods and Materials

Male 8 weeks Sprague-Dawley rats (n=60) were divided into ethanol administered group and control group. Rats received 1.0, 2.0 and 3.0g/kg body weight (BW) of ethanol (as 20% (w/w)) by intragastric intubation. Whole bloods were assayed at constant interval. Tail venous blood samples were used for count analyses based on the flow cytometric technique of the number of total WBCs, neutrophil, eosinophil, basophil, monocyte and lymphocytes.

Results and Discussion

The administration of high-dose ethanol (2.0 and 3.0g/kg BW) increased the number of total WBCs according to the dose dependent manner. The number of neutrophil increased after the administration of ethanol, and the magnitude of this response clearly increased according to the dose dependent manner. The administration of 2.0g/kg BW increased drastically the number of basophil. However, no response-effects in the number of basophil were observed in the administrations of 1.0 and 3.0g/kg BW. The administration of 2.0g/kg BW increased significantly the number of monocyte. However, the administration of 3.0g/kg BW decreased markedly the number of monocyte. No response-effects in the administration of ethanol were observed in the number of lymphocytes.

These results suggest that administrations of high-dose ethanol induced either promotive effects of the increased number of total WBCs and neutrophil or suppressive effects of the increased number of eosinophil, basophil and monocyte.

Conclusion

The administrations (dose=1.0~3.0g/kg BW) of ethanol to male rats change markedly the number of natural immunity cells (neutrophil, basophil and monocyte) without changing the number of acquired immunity cells (lymphocytes).